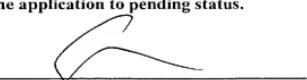


| | | | | |
|---|--|--|---|--------------------------|
| FORM PTO-1390 (REV 10-95) | | U S DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE | | ATTORNEY'S DOCKET NUMBER |
| TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. §371 | | | | MERCK 2341 |
| INTERNATIONAL APPLICATION NO PCT/EP00/06314 | | INTERNATIONAL FILING DATE 5 JULY 2000 | U S APPLICATION NO (If known, see 37 CFR §15) 10/031787 | |
| | | | PRIORITY DATE CLAIMED 28 JULY 1999 | |
| TITLE OF INVENTION ETCHING SOLUTION, CONTAINING HYDROFLUORIC ACID | | | | |
| APPLICANT(S) FOR DO/EO/US ZIELINSKI, Claudia, et al. | | | | |
| <p>Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:</p> <p>1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. §371</p> <p>2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. §371.</p> <p>3. <input type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. §371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. §371(b) and PCT Articles 22 and 39(1)</p> <p>4. <input checked="" type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date</p> <p>5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. §371(c)(2))</p> <p>a. <input type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau)</p> <p>b. <input checked="" type="checkbox"/> has been transmitted by the International Bureau.</p> <p>c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US)</p> <p>6. <input checked="" type="checkbox"/> A translation of the International Application into English (35 U.S.C. §371(c)(2)).</p> <p>7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. §371(c)(3))</p> <p>a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau).</p> <p>b. <input type="checkbox"/> have been transmitted by the International Bureau</p> <p>c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired.</p> <p>d. <input checked="" type="checkbox"/> have not been made and will not be made.</p> <p>8. <input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. §371(c)(3)).</p> <p>9. <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. §371(c)(4)).</p> <p>10. <input type="checkbox"/> A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. §371(c)(5))</p> <p>Items 11. to 16. below concern document(s) or information included:</p> <p>11. <input type="checkbox"/> An Information Disclosure Statement under 37 C.F.R. §§1.97 and 1.98.</p> <p>12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 C.F.R. §§3.28 and 3.31 is included</p> <p>13. <input checked="" type="checkbox"/> A FIRST preliminary amendment.</p> <p><input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment.</p> <p>14. <input type="checkbox"/> A substitute specification</p> <p>15. <input type="checkbox"/> A change of power of attorney and/or address letter</p> <p>16. <input type="checkbox"/> Other items or information:</p> | | | | |

| | | | |
|--|------------------------------|---|--------------------|
| U.S. APPLICATION NO. (if known, 37 CFR 1.1) | INTERNATIONAL APPLICATION NO | ATTORNEY'S DOCKET NUMBER | |
| 10/031787 | PCT/EP00/06314 | MERCK 2341 | |
| 17. <input checked="" type="checkbox"/> The following fees are submitted: | | CALCULATIONS PTO USE ONLY | |
| BASIC NATIONAL FEE (37 CFR §1.492 (a) (1) - (5)): | | | |
| Search Report has been prepared by the EPQ or JPO \$890.00 | | | |
| International preliminary examination fee paid to USPTO (37 CFR §1.482) \$710.00 | | | |
| No international preliminary examination fee paid to USPTO (37 CFR §1.482) but international search fee paid to USPTO (37 CFR §1.445(a)(2)) \$740.00 | | | |
| Neither international preliminary examination fee (37 CFR §1.482) nor international search fee (37 CFR §1.445(a)(2)) paid to USPTO \$1040.00 | | | |
| International preliminary examination fee paid to USPTO (37 CFR §1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) \$100.00 | | | |
| ENTER APPROPRIATE BASIC FEE AMOUNT = | | \$890.00 | |
| Surcharge of \$130.00 for furnishing the oath or declaration later than months from the earliest claimed priority date (37 C.F.R. §1.492(c)). | | <input type="checkbox"/> 20 <input type="checkbox"/> 30 | |
| CLAIMS | NUMBER FILED | NUMBER EXTRA | RATE |
| Total claims | 8 - 20 = | 0 | x \$ 18.00 \$ 0.00 |
| Independent claims | 1 - 3 = | 0 | x \$ 84.00 \$ 0.00 |
| MULTIPLE DEPENDENT CLAIM(S) (if applicable) | | + \$ 280.00 | |
| TOTAL OF ABOVE CALCULATIONS = | | \$890.00 | |
| Reduction of 1/2 for filing by small entity, if applicable A Verified Small Entity Statement must also be | | | |
| SUBTOTAL = | | \$890.00 | |
| Processing fee of \$130.00 for furnishing the English translation later than months from the earliest claimed priority date (37 C.F.R. §1.492(f)). | | <input type="checkbox"/> 20 <input type="checkbox"/> 30 | |
| TOTAL NATIONAL FEE = | | \$890.00 | |
| Fee for recording the enclosed assignment (37 C.F.R. §1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 C.F.R. §§3.28, 3.31). \$40.00 per property. | | | |
| TOTAL FEES ENCLOSED = | | \$890.00 | |
| | | Amount to be refunded: | |
| | | charged: | |
| <p>a. <input type="checkbox"/> A check in the amount of <u>\$890.00</u> to cover the above fees is enclosed.</p> <p>b. <input type="checkbox"/> Please charge my Deposit Account No. <u>13-3402</u> in the amount of <u>\$</u> to cover the above fees. A duplicate copy of this sheet is enclosed.</p> <p>c. <input type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>13-3402</u>. A duplicate copy of this sheet is enclosed.</p> | | | |
| <p>NOTE: Where an appropriate time limit under 37 C.F.R. §§1.494 or 1.495 has not been met, a petition to revive (37 C.F.R. §1.137(a) or (b)) must be filed and granted to restore the application to pending status.</p> | | | |
| SEND ALL CORRESPONDENCE TO Customer Number 23,599 | | | |
|  23599 <small>PATENT TRADEMARK OFFICE</small> | |  SIGNATURE <u>Anthony J. Zelano</u> NAME 27,969 <small>REGISTRATION NUMBER</small> | |
| Filed: 25 JANUARY 2002 | | | |
| AJZ:kmo | | | |

IN THE UNITED STATES DESIGNATED/ELECTED OFFICE

International Application No. : PCT/EP00/06314

International Filing Date : 5 JULY 2000

Priority Date(s) Claimed : 28 JULY 1999

Applicant(s) (DO/EO/US) : ZIELINSKI, Claudia, et al.

Title: ETCHING SOLUTION, CONTAINING HYDROFLUORIC ACID

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

SIR:

Prior to calculating the national fee, and prior to examination in the National Phase of the above-identified International application, please amend as follows:

IN THE CLAIMS:

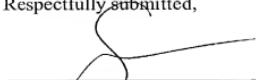
6. (Amended) Etching solutions according to Claim 1, comprising water in an amount of from 1 to 20% by weight.
7. (Amended) Etching solutions according to Claim 1, comprising a mixture of high-purity individual components.
8. (Amended) Use of the etching solutions according to Claim 1 for the selective etching of doped silicate layers.

REMARKS

The purpose of this Preliminary Amendment is to eliminate multiple dependent claims in order to avoid the additional fee. Applicants reserve the right to reintroduce claims to canceled combined subject matter.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached pages are captioned "**Version With Markings to Show Changes Made**".

Respectfully submitted,



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Email: zelano@mwzb.com

AJZ:kmo

Filed: 25 January 2002

VERSION WITH MARKINGS TO SHOW CHANGES MADE

Claims 6 to 8 have been amended as follows:

6. (Amended) Etching solutions according to Claims 1-to-5, comprising water in an amount of from 1 to 20% by weight.
7. (Amended) Etching solutions according to Claims 1-to-6, comprising a mixture of high-purity individual components.
8. (Amended) Use of the etching solutions according to Claims 1-to-6 for the selective etching of doped silicate layers.

u/PV

- 1 -

Etching solution comprising hydrofluoric acid

This invention relates to etching solutions comprising hydrofluoric acid and organic solvents for use in the 5 process for the production of integrated circuits. The etching solutions according to the invention are particularly suitable for the selective etching of doped silicate layers.

10 In the semiconductor industry, various types of integrated circuit are produced by the deposition of various dielectric layers. These can be, for example, deposited borosilicate glass (BSG) layers, phosphorus-silicate glass (PSG) layers, boron-phosphorus-silicate 15 layers (BPSG) layers, oxide layers of thermal oxide or oxide layers deposited from tetraethyl orthosilicate (TEOS).

20 At various points of the semiconductor process, doped glass layers are usually applied to undoped glass layers. These are usually boron-doped glass (BSG) on a thermal oxide, phosphorus-doped glass (PSG) on a thermal oxide or boron-phosphorus-doped (BPSG) glass on a thermal oxide. The abovementioned layers can also be 25 applied to a TEOS oxide.

After these doped layers have been applied, they must be removed again in places by etching. Depending on the 30 intended application, it may be necessary to etch BSG, PSG or BPSG layers selectively to give thermal or TEOS oxide.

Since the doped layers exhibit a surface topography, due to the underlying structures, the layer thickness 35 to be removed is not the same in all areas of the wafer. However, in order to remove sufficient material in all areas to be etched, the etching time must be selected to be sufficiently long for even the thickest

layers to be etched through. Since the etching medium in this so-called over-etching time acts on the underlying thermal or TEOS oxide in the areas with an originally thinner layer of doped glass, an etching 5 medium is necessary which etches the doped oxides at a much higher rate than the undoped oxides.

For etching in spin etcher operation, preference is given here to mixtures of concentrated H_2SO_4 and 50% HF. 10 These mixtures are already selective in respect of various layers and result essentially in a uniform quality of the etched layer.

However, our own experiments with various commercially 15 available etching media have shown inadequate selectivity during etching. It has also been found here that although selective etching can be achieved with other mixtures, the uniformity of the etching is, however, inadequate for the processes.

20 The object of the present invention is therefore to provide the semiconductor industry with etching mixtures for the production of integrated circuits which, while having a high etching rate, also have 25 significantly improved selectivity and result in uniform etching.

The object is achieved by etching solutions comprising 30 hydrofluoric acid, an organic solvent, individually or as a mixture selected from the group consisting of ethylene glycol, propylene glycol, ethanol and glycerol, and water for the production of integrated circuits.

35 Hydrofluoric acid is preferably employed in an amount of 5 - 20% by weight in the etching solutions according to the invention.

In particular, the object is achieved by etching solutions comprising only an organic solvent selected from the group consisting of ethylene glycol, propylene glycol, ethanol and glycerol.

5

The invention also relates to etching solutions comprising, as organic solvents a mixture consisting of ethylene glycol and glycerol in a mixing ratio of from 1:10 to 10:1.

10

Etching solutions which have proven good for the purposes of the invention are those which comprise, as organic solvent, ethylene glycol and glycerol in a mixing ratio of from 1:5 to 5:1.

15

The object on which this invention is based is furthermore achieved by etching solutions comprising water in an amount of from 1 to 20% by weight.

20

For the purposes of the invention, the object of this invention is achieved by etching solutions comprising a mixture of high-purity individual components.

25

In particular, the invention also relates to the use of the novel etching solutions described here for the selective etching of doped silicate layers.

30

The mixtures developed here enable the selectivities and uniformity of etching to be significantly improved depending on the process for the deposition of the individual layers.

35

It is advantageous that the etching rate achieved with the solutions according to the invention for the etching of PSG layers, BSG layers and BBSG layers is a multiple higher (up to > 300) than for TEOS layers or layers of thermal oxide.

These selectivities have been observed in the case of etching in a spin etcher and during dip etching processes.

- 5 Organic solvents which can be used are ethylene glycol, propylene glycol, ethanol, isopropanol, glycerol and mixtures thereof. The etching rates which can be achieved using these solvents are dependent on the solvents used and on the mixing ratio of the individual
10 organic solvents with one another. The etching rate is furthermore greatly affected by the amount of hydrofluoric acid present in the solution and very particularly by the amount of water present.
- 15 The hydrofluoric acid content in the mixtures tested as successful is from 5 to 20% by weight of HF. Suitable solvents are in particular pure ethylene glycol, pure propylene glycol, pure ethanol or pure glycerol. In the case of solvent mixtures, the mixtures of glycerol and
20 ethylene glycol in a ratio of from 1:10 to 10:1, in particular, exhibited a very selective etching behaviour.

Especially in the dip etching process, the etching
25 solutions on which the invention is based exhibit significantly more uniform etching than in the case of commercially available etching solutions.

The following table shows some examples of the
30 selectivities achieved between BSG glass and thermal oxide, achieved in the dip etching process.

Table 1

| No. | Organic component | Selectivity (BSG to therm. oxide) |
|-----|--------------------------------|---|
| 1 | Ethylene glycol | 97 |
| 2 | Glycerol | 124 |
| 3 | Ethylene glycol:glycerol = 1:1 | 101 |
| 4 | Ethylene glycol:glycerol = 1:2 | 69 |
| 5 | Ethylene glycol:glycerol = 2:1 | 76 |

5 A great advantage over the existing mixtures is the evenness of the surface after etching. This improved uniformity has a positive effect on the etching process since it allows the over-etching times to be significantly shortened. Pictures 1 to 3 show SEM photomicrographs of a BSG layer etched by dip etching 10 with spin etch F as comparative solution. An undesired hole which formed in the surface during etching is very clear in photomicrograph 3.

15 Corresponding holes are not found on use of the etching solutions according to the invention.

20 Experiments with the etching solutions according to invention were carried out in a spin etcher as produced and marketed by SEZ. The solutions can, however, also be used on use of comparable apparatuses. The mode of operation of a spin etcher of this type is explained diagrammatically in Fig. 1.

25 Diagrams 1 - 6 show the wafer profile of BSG wafers after the etching operation with two mixtures which are the subject-matter of the application and with spin etch F, a comparative solution. It is clearly evident from these that the layer thickness after etching with spin etch F is significantly less uniform than after 30 etching with the mixtures in accordance with the

present invention. All etching experiments were carried out using the same parameters.

5 In particular, the etching experiments carried out showed that an excessively high water content has an adverse effect on the selectivity of the etching. Good results are accordingly achieved at a water content of from 2 to 20% by weight. Since the water content is essentially determined by the addition of hydrofluoric 10 acid, the strongest possible hydrofluoric acid grades are employed for the preparation of the etching solutions. Instead of 50% hydrofluoric acid, 70% hydrofluoric acid is therefore used.

15 In order to illustrate the effect of the amount of water present in the etching solution, Table 2 shows how the etching rates, and thus also the selectivities, change in the ethylene glycol/HF mixture at constant HF concentration, but at different water contents.

20

Table 2

| Mixture | Etching rate BSG glass | Thermal oxide |
|--|---------------------------|---------------|
| 70% ethylene glycol + 15% HF + 15% H ₂ O | 3310 nm/min | 48 nm/min |
| 78.6% ethylene glycol + 15% HF + 6.4% H ₂ O | 2507 nm/min | 14 nm/min |

PATENT CLAIMS

1. Etching solutions comprising hydrofluoric acid, an organic solvent, individually or as a mixture selected 5 from the group consisting of ethylene glycol, propylene glycol, ethanol and glycerol, and water for the production of integrated circuits.
2. Etching solutions according to Claim 1, comprising 10 5 - 20% by weight of hydrofluoric acid.
3. Etching solutions according to Claim 1, comprising an organic solvent selected from the group consisting of ethylene glycol, propylene glycol, ethanol and 15 glycerol.
4. Etching solutions according to Claim 1, comprising, as organic solvent, ethylene glycol and glycerol in a mixing ratio of from 1:10 to 10:1. 20
5. Etching solutions according to Claim 1, comprising, as organic solvent, ethylene glycol and glycerol in a mixing ratio of from 1:5 to 5:1.
- 25 6. Etching solutions according to Claims 1 to 5, comprising water in an amount of from 1 to 20% by weight.
- 30 7. Etching solutions according to Claims 1 to 6, comprising a mixture of high-purity individual components.
- 35 8. Use of the etching solutions according to Claims 1 to 6 for the selective etching of doped silicate layers.

ABSTRACT

This invention relates to etching solutions which comprise hydrofluoric acid and organic solvents for use in the process for the production of integrated circuits. The etching solutions according to the invention are particularly suitable for the selective etching of doped silicate layers.

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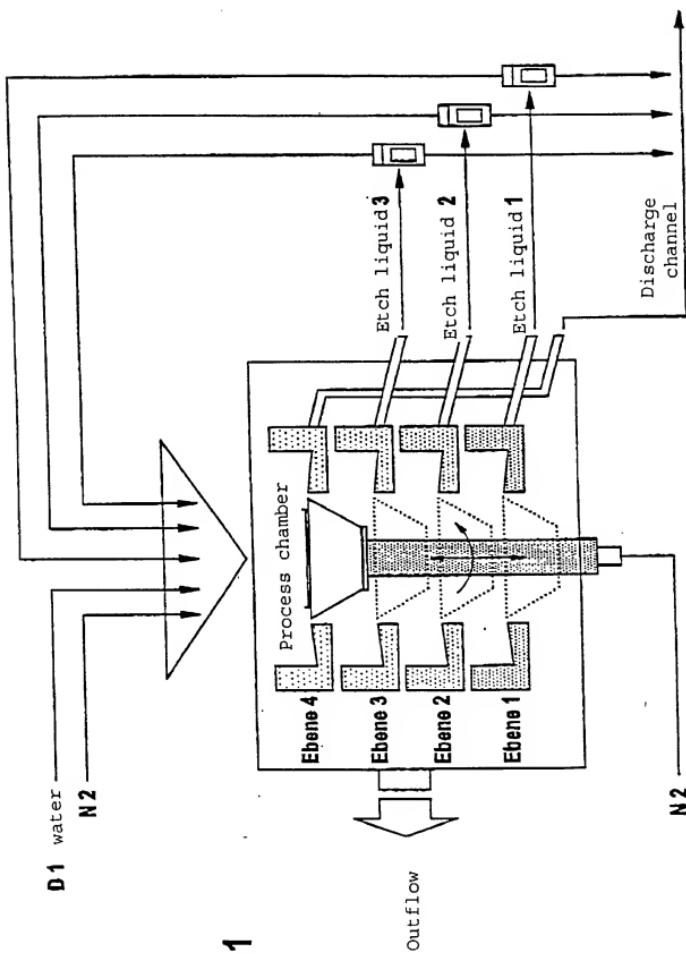


Fig. 1

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Heading = Wafer profile after etching with spin etch F
in a spin etcher

Diagram 1

Vertical measurement values

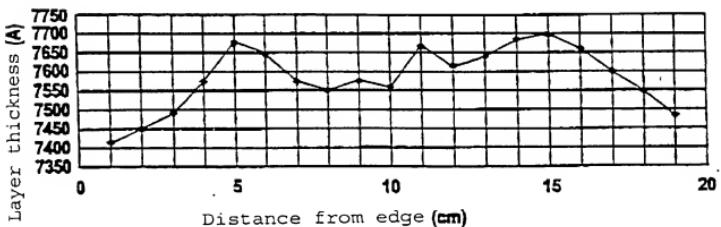
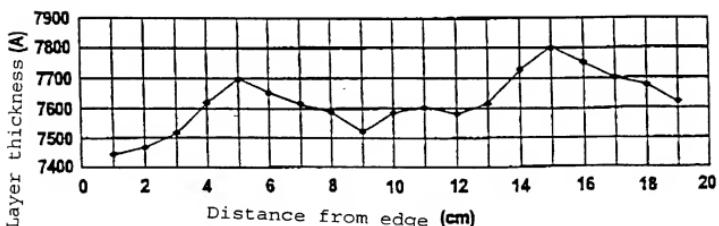


Diagram 2

Horizontal measurement values



3 / 4

Wafer profile after etching with ethylene
glycol / HF (15%) in a spin etcher

Diagram 3

Vertical measurement values

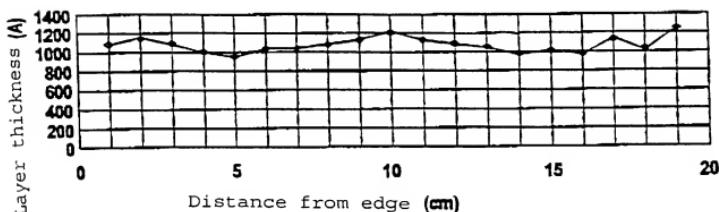
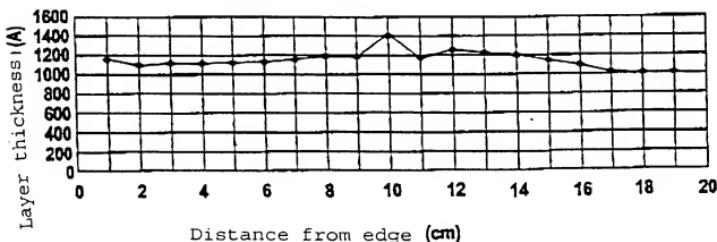


Diagram 4

Horizontal measurement values



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10/031787

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Wafer profile after etching with ethylene glycol / glycerol / HF (15%) in a spin etcher

Diagram 5

Vertical measurement values

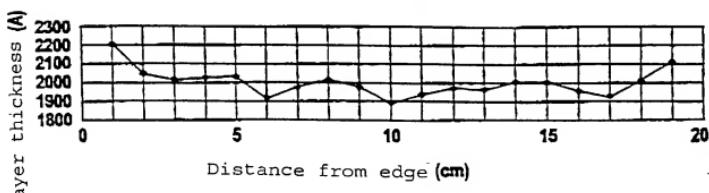
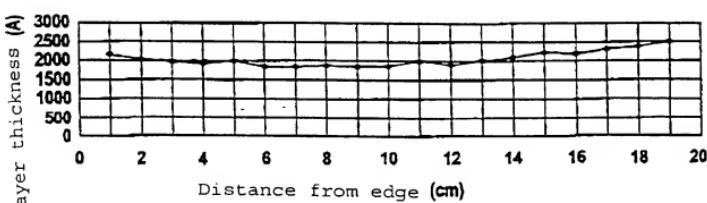


Diagram 6

Horizontal measurement values



COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY
(Includes Reference to PCT International Applications)

ATTORNEY'S DIRECTOR FIRMNAME

As a below named inventor, I hereby declare that

My residence, post office address and citizenship are as stated below next to my name

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

ETCHING SOLUTION COMPRISING HYDROFLUORIC ACID

the specification of which (check only one item below)

is attached hereto
 was filed as United States application

Serial No.

on _____

and was amended

on _____ (if applicable)

was filed as PCT international application

Number PCT/EP00/06314on 5 July 2000

and was amended under PCT Article 19

on _____ (if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim priority benefits under Title 35, United States Code, § 119 or 365 (b) of the following United States provisional application(s) and of any foreign application(s) for patent or inventor's certificate or 365(a) of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed

PRIOR U.S. PROVISIONAL AND FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:

| COUNTRY (if PCT, indicate "PCT") | APPLICATION NUMBER | DATE OF FILING (day, month, year) | PRIORITY CLAIMED UNDER 35 USC 119 |
|-------------------------------------|--------------------|--------------------------------------|---|
| Germany | 199 35 446.4 | 28 July 1999 | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO |
| | | | <input type="checkbox"/> YES <input type="checkbox"/> NO |
| | | | <input type="checkbox"/> YES <input type="checkbox"/> NO |
| | | | <input type="checkbox"/> YES <input type="checkbox"/> NO |
| | | | <input type="checkbox"/> YES <input type="checkbox"/> NO |

15
 POWER OF ATTORNEY. As a named inventor, I hereby appoint L. William Millen (19,546), John L. White (17,556), Anthony Y. Zelano (27,969), Alan E. Branigan (20,565), John R. Moses (24,043), Harry B. Shulag (32,004), Bruce P. Hasney (32,543), Richard J. Traverson (30,595), John A. Supp (33,103), Richard M. Lebovitz (37,067), James E. Kuhard (37,432), Nancy Axelson (44,014), Jennifer J. Branigan (40,921), Robert E. McCarthy (46,044), and Csaba Henley (50,908) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

Send Correspondence to Customer No 23599

Telephone No
703/243-6333

Direct Telephone Calls to:





23599

PATENT TRADEMARK OFFICE

Combined Declaration for Patent Application and Power of Attorney (Continued)
 (Includes Reference to PCT International Applications)

ATTORNEY'S DOCKET NUMBER

| | | | | |
|-------------|---|---------------------------------------|---|--|
| 2 0 1 | FULL NAME OF INVENTOR <u>WIEGAND</u> | FAMILY NAME <u>WIEGAND</u> | FIRST GIVEN NAME <u>Claudia</u> | SECOND GIVEN NAME |
| 2 0 1 | RESIDENCE & CITIZENSHIP <u>CITY 64291 Darmstadt</u> | STREET <u>Frankfurter Str. 250</u> | STATE OR FOREIGN COUNTRY <u>Alsheimweg 14</u> | COUNTRY OF CITIZENSHIP <u>Germany</u> |
| 2 0 2 | POST OFFICE ADDRESS | | CITY <u>64293 Darmstadt</u> | STATE & ZIP CODE/COUNTRY <u>Germany</u> |
| 2 0 2 | FULL NAME OF INVENTOR <u>RHEIN</u> | FAMILY NAME <u>RHEIN</u> | FIRST GIVEN NAME <u>Rudolf</u> | SECOND GIVEN NAME |
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| 2 0 3 | POST OFFICE ADDRESS | | CITY <u>64293 Darmstadt</u> | STATE & ZIP CODE/COUNTRY <u>Germany</u> |
| 2 0 3 | FULL NAME OF INVENTOR <u>TEMPEL</u> | FAMILY NAME <u>TEMPEL</u> | FIRST GIVEN NAME <u>Eberhard</u> | SECOND GIVEN NAME |
| 2 0 4 | RESIDENCE & CITIZENSHIP <u>CITY 64342 Seehheim-Jugenheim</u> | STREET <u>Frankfurter Str. 250</u> | STATE OR FOREIGN COUNTRY <u>Alsbacher Strasse 4</u> | COUNTRY OF CITIZENSHIP <u>Germany</u> |
| 2 0 4 | POST OFFICE ADDRESS | | CITY <u>64293 Darmstadt</u> | STATE & ZIP CODE/COUNTRY <u>Germany</u> |
| 2 0 5 | FULL NAME OF INVENTOR | FAMILY NAME | FIRST GIVEN NAME | SECOND GIVEN NAME |
| 2 0 5 | RESIDENCE & CITIZENSHIP <u>CITY</u> | | STATE OR FOREIGN COUNTRY | COUNTRY OF CITIZENSHIP |
| 2 0 5 | POST OFFICE ADDRESS | STREET | CITY | STATE & ZIP CODE/COUNTRY |
| 2 0 6 | FULL NAME OF INVENTOR | FAMILY NAME | FIRST GIVEN NAME | SECOND GIVEN NAME |
| 2 0 6 | RESIDENCE & CITIZENSHIP <u>CITY</u> | | STATE OR FOREIGN COUNTRY | COUNTRY OF CITIZENSHIP |
| 2 0 6 | POST OFFICE ADDRESS | STREET | CITY | STATE & ZIP CODE/COUNTRY |
| 2 0 7 | FULL NAME OF INVENTOR | FAMILY NAME | FIRST GIVEN NAME | SECOND GIVEN NAME |
| 2 0 7 | RESIDENCE & CITIZENSHIP <u>CITY</u> | | STATE OR FOREIGN COUNTRY | COUNTRY OF CITIZENSHIP |
| 2 0 7 | POST OFFICE ADDRESS | STREET | CITY | STATE & ZIP CODE/COUNTRY |

Combined Declaration for Patent Application and Power of Attorney (Continued)
(Includes Reference to PCT International Applications)

ATTORNEY'S DOCKET NUMBER

| | | | | |
|-------------|-------------------------|-------------|--------------------------|--------------------------|
| 2 0 8 | FULL NAME OF INVENTOR | FAMILY NAME | FIRST GIVEN NAME | SECOND GIVEN NAME |
| | RESIDENCE & CITIZENSHIP | CITY | STATE OR FOREIGN COUNTRY | COUNTRY OF CITIZENSHIP |
| | POST OFFICE ADDRESS | STREET | CITY | STATE & ZIP CODE/COUNTRY |
| 2 0 9 | FULL NAME OF INVENTOR | FAMILY NAME | FIRST GIVEN NAME | SECOND GIVEN NAME |
| | RESIDENCE & CITIZENSHIP | CITY | STATE OR FOREIGN COUNTRY | COUNTRY OF CITIZENSHIP |
| | POST OFFICE ADDRESS | STREET | CITY | STATE & ZIP CODE/COUNTRY |
| 2 1 0 | FULL NAME OF INVENTOR | FAMILY NAME | FIRST GIVEN NAME | SECOND GIVEN NAME |
| | RESIDENCE & CITIZENSHIP | CITY | STATE OR FOREIGN COUNTRY | COUNTRY OF CITIZENSHIP |
| | POST OFFICE ADDRESS | STREET | CITY | STATE & ZIP CODE/COUNTRY |
| 2 1 1 | FULL NAME OF INVENTOR | FAMILY NAME | FIRST GIVEN NAME | SECOND GIVEN NAME |
| | RESIDENCE & CITIZENSHIP | CITY | STATE OR FOREIGN COUNTRY | COUNTRY OF CITIZENSHIP |
| | POST OFFICE ADDRESS | STREET | CITY | STATE & ZIP CODE/COUNTRY |
| 2 1 2 | FULL NAME OF INVENTOR | FAMILY NAME | FIRST GIVEN NAME | SECOND GIVEN NAME |
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

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|--|-------------------------|---------------------------|------|
| SIGNATURE OF INVENTOR 201 <i>Clarice Wiegand</i> | DATE <i>14.05.02</i> | SIGNATURE OF INVENTOR 207 | DATE |
| SIGNATURE OF INVENTOR 202 <i>Heidi Reis</i> | DATE <i>14.05.02</i> | SIGNATURE OF INVENTOR 208 | DATE |
| SIGNATURE OF INVENTOR 203 <i>Hildegard Tempel</i> | DATE <i>14.05.02</i> | SIGNATURE OF INVENTOR 209 | DATE |
| SIGNATURE OF INVENTOR 204 | DATE | SIGNATURE OF INVENTOR 210 | DATE |
| SIGNATURE OF INVENTOR 205 | DATE | SIGNATURE OF INVENTOR 211 | DATE |
| SIGNATURE OF INVENTOR 206 | DATE | SIGNATURE OF INVENTOR 212 | DATE |